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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,275	02/24/2004	Tsutomu Tetsuka	648.43518X00	8920
20457	7590	06/09/2009	EXAMINER	
ANTONELLI, TERRY, STOUT & KRAUS, LLP			ZERVIGON, RUDY	
1300 NORTH SEVENTEENTH STREET				
SUITE 1800			ART UNIT	PAPER NUMBER
ARLINGTON, VA 22209-3873			1792	
			MAIL DATE	DELIVERY MODE
			06/09/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

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1 RECORD OF ORAL HEARING

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3 UNITED STATES PATENT AND TRADEMARK OFFICE

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5

6 BEFORE THE BOARD OF PATENT APPEALS
7 AND INTERFERENCES

8

9

10 Ex parte TSUTOMU TETSUKA,
11 KAZUYUKI IKENAGA,
12 TETSUO, ONO,
13 MOTOHIKO YOSHIGAI, and
14 NAOSHI ITABASHI

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17 Appeal 2009-002780
18 Application 10/784,275
19 Technology Center 1700

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22 Oral Hearing Held: May 13, 2009

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26 Before ADRIENE LEPIANE HANLON, CHUNG K. PAK, and
27 JEFFREY B. ROBERTSON, Administrative Patent Judges

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30 ON BEHALF OF THE APPELLANT:

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1 MS. BOBO-ALLEN: Good morning. Calendar No. 9, Appeal No.
2 2009-2780, Mr. Kraus.

3 JUDGE HANLON: Good morning, Mr. Kraus.

4 MR. KRAUS: Good morning.

5 JUDGE HANLON: You have 20 minutes to begin --

6 MR. KRAUS: Okay. Thank you --

7 JUDGE HANLON: I'm sorry, 20 minutes for your argument. You
8 may begin.

9 MR. KRAUS: Okay. This is Appeal No. 2009-2780. The case
10 relates to a plasma processing apparatus, and, basically, in the specification
11 of the application, we describe prior art problems that, initially, the reaction
12 chambers were made of metal and when you had plasma processing, there
13 was sputtering from the walls of the chamber and contaminated the
14 substrate. And then they put dielectric material on the inner walls of the
15 chamber, and they had other problems, chipping of the dielectric.

16 And we discuss that and we talk about prior art in the specification,
17 which tried to solve the problem. And one of the ways they tried to solve
18 the problem was putting in a conductive member in the chamber, which
19 helped out, but it didn't solve all the problems. And that's where we start
20 from in this invention.

21 And, basically, in -- we look to claim one, which is the only
22 independent claim on appeal. It says a plasma processing apparatus, et
23 cetera, et cetera, wherein a dielectric that is exposed to the plasma
24 substantially covers a surface portion of an inner wall of the reaction
25 chamber. An electrically conductive member is disposed within the reaction
26 chamber, and I guess if you refer to figure 1 of the drawings, it's shown

1 there. The electrically conductive member is 21A, for example. That's in
2 Fig. 1. So as to be exposed to the plasma within the reaction chamber at a
3 position with respect to the inner wall of the reaction chamber, which is
4 covered with the dielectric.

5 JUDGE HANLON: Does that language, "At a position with respect
6 to the inner wall of the reaction
7 chamber" --

8 MR. KRAUS: I'm sorry?

9 JUDGE HANLON: I'm sorry. Does the language "At a position with
10 respect to the inner wall of the reaction chamber," does that require attached
11 to the inner wall?

12 MR. KRAUS: No.

13 JUDGE HANLON: Okay. What does that require?

14 MR. KRAUS: Just that it's in the chamber and it's at some position
15 with respect --

16 JUDGE HANLON: With respect to?

17 MR. KRAUS: It's a very broad -- but later on, we further define the
18 location. The electrically conductive member is electrically coupled to earth
19 either directly or through an inner wall of the reaction chamber so as to form
20 a DC earth, which enables direct current to flow therein from the plasma.
21 You've got the plasma in the chamber and the electrically conductive
22 member gets a DC flow outside.

23 The electrically conductive member -- and this is, as described in the
24 specification of this application, an important feature. The conductive
25 member has an area in a range of 0.1 percent to 10 percent of the inner wall
26 area of the reaction chamber. And, as described, if it's less than 1 percent,

1 you don't get the feature -- that's the lower end. If it's over 10 percent,
2 you've got other problems. So we describe the, in the specification, where
3 this range is critical.

4 Then you have a magnetic field generation means disposed outside
5 of the reaction chamber, and that's represented by 15 in Fig. 1, which applies
6 magnetic field to the plasma. And the electrically conductive member
7 forming the DC earth is disposed at a position crossing a magnetic line of
8 force that is closer to the substrate holder than a magnetic line of force that
9 crosses the inner wall of the reaction chamber, having the dielectric therein.
10 And that's described in the specification.

11 The rejection is a 103 rejection over two references. One is
12 Kadomura, et al., and the other is Kawasaki. And it's interesting. The
13 Examiner, in the final rejection and in the Examiner's Answer, gives a huge
14 list of what Kadomura doesn't disclose or teach. And one of the things that
15 it doesn't, there is no electrically conductive member in there.

16 The -- it does have -- although in one embodiment, the walls of the
17 reaction chamber are aluminum and in another, it's covered with a dielectric.
18 So I'm not going to, you know, pursue that matter. But, basically, the
19 Examiner admits there is no electrically conductive member connected to
20 earth, disposed in the chamber, and having any of the features that are
21 recited in claim 1.

22 So the Examiner refers to the Kawasaki, et al patent and says, oh,
23 there is a grounded electrode 11, and that's shown in figure 1 of Kawasaki, et
24 al. And it doesn't say anything in the specification. The only thing, only
25 description, is found in column 3, lines 49 to 51, which says "A ground

1 electrode 11 is disposed around the outer periphery of the electrode 5 and
2 electrically insulated there from." That's the extent.

3 We have no disclosure of what the ground electrode 11 is structurally
4 or in relation to an inner wall of the chamber. It's really not clear in
5 Kawasaki, and I would suggest to you that the chamber wall -- well, it's got
6 two parts. It's got a silica discharge to one and a vacuum treating vessel
7 four.

8 In the art at this time, and, again, there is no disclosure, in all
9 probability, and, again, I can't point to anything in the disclosure and neither
10 could the Examiner, the treatment chamber four is probably metal. I don't
11 know. I can't -- there is nothing that describes it. But it is also not described
12 as having a dielectric on it. And assuming the silica discharge to -- is, you
13 know, can be considered a dielectric, there is nothing with respect to the
14 treatment chamber four.

15 And, basically, the Examiner says, aha, it's obvious I could put a --
16 this grounded electrode into the Kadomura patent and I've got what you're
17 claiming. Even if that was a proper modification -- and I would suggest to
18 you that this Kawasaki, which issued in 1989, was available to Kadomura,
19 which was filed almost ten years later, in 1998, and knew about, you know,
20 grounded electrodes because, as I say, we have described in the specification
21 of this application publications that went back to -- let's see. Well,
22 unfortunately, they're later. They're '99. But, again, ten years earlier they
23 knew about them.

24 But even if you say this is an obvious combination, again, there is no
25 description that it's used in the one where you have the dielectric, because,
26 as I say, in Kadomura, there's two embodiments, one that doesn't have a

1 dielectric covering and one that does. There is no disclosure or teaching of
2 the relationship of the area of the conductive member to the inner wall area.

3 JUDGE ROBERTSON: Can I interrupt you for a second, here? May
4 interrupt you for a second?

5 MR. KRAUS: Sure. Excuse me. I have a hearing problem, so please
6 --

7 JUDGE ROBERTSON: The Examiner makes -- I guess the
8 Examiner's position is that the relationship of the area, that that could be
9 adjusted based on the size of the work area you want or other factors in
10 taking this electrically conductive member of Kawasaki and putting it into
11 the Kadomura reference. Is there any evidence
12 that -- can you direct us to any evidence that that wouldn't be the case that --
13 wouldn't be able to do that or --

14 MR. KRAUS: Well, I'm not saying that you can't do it. The problem
15 is we described in the specification a relationship. And, let's face it, 0.01
16 percent to 10 percent is a pretty large, you know, range. But where -- there
17 is nothing, first of all, there is nothing -- as I say, Kadomura doesn't have
18 such an electrically conductive member. Kawasaki, assuming that the
19 ground electrode 11 is such a member, there is no description of anything.
20 And I would suggest to you that the inner wall of the chamber in Kawasaki
21 is metal, isn't covered with a dielectric.

22 You know, yes, you can do it, and the fact is, Applicants did conduct
23 experiments and found out that this was the relationship that was required.
24 If it's over 10 percent, there's problems, and if it's less than 0.01 percent,
25 there are problems. But is there any teaching -- you know, yes, there is no
26 question that this grounded electrode has an area which is smaller than the

1 inner wall surface area. What that is, nobody knows. Is it less than 0.01
2 percent? I can't tell you. Is it greater than 10 percent? I don't know,
3 because there is no description. We have put in reasons for this. It's critical.
4 And the Examiner says, oh, anybody can do it. There is no disclosure in any
5 of these references. And, as I say, the fact is, we've got better -- if you'd use
6 the art that we had cited in our specification, I think he probably could have
7 made a better rejection than he did with this combination. And I'm not
8 suggesting that the Board do that.

9 But all I'm saying is we described what was available in the prior art,
10 why it didn't work. And here we come in and say, okay, this is what we've
11 done to solve those problems. Neither Kadomura or Kawasaki have any
12 description of problems or the solutions that we've provided. And for the
13 Examiner to suggest, yes, you can optimize this -- one of skill and art could
14 do it. There is no question in my mind that if you have the dielectric
15 covering, the -- and you put in the conductive member, you can run
16 experiments to optimize and you can come up with the range that we came
17 up with. But how did you get there? The Examiner is just saying, oh, it
18 could be done. There is no disclosure teaching in the references to do this.

19 Then we have also where you position this --

20 JUDGE ROBERTSON: Can I interrupt you for a second?

21 JUDGE HANLON: Excuse me.

22 JUDGE ROBERTSON: Interrupt you for one second?

23 MR. KRAUS: I'm sorry.

24 JUDGE ROBERTSON: You're making the case here that 0.01 to 10
25 percent is a significant range?

26 MR. KRAUS: Yes.

1 JUDGE ROBERTSON: In your specification, it says, you know, with
2 respect to that, on page 23, that the experiments you did, it says "The area of
3 the conductive member described here corresponds to approximately 0.3 to
4 2.5 percent of the whole side wall area of the reaction chamber one." And
5 then later on you say "It is considered desirable to provide a conductive
6 material having an area of less than approximately 10 percent of the whole
7 reaction chamber wall area to function as a highly effective -- to function as
8 the effective earth for high frequency to obtain advantageous results without
9 fail."

10 So, you know, your range that you're claiming is broader than what
11 you indicated that you've done the results for. So I'm wondering, you know,
12 why, for the extent of your range, you know, why wouldn't the Examiner's
13 motivation, you know, for optimization be sufficient to get to that range
14 above what you're saying?

15 MR. KRAUS: Well, for one, there is no reason to put the conductive
16 member in Kadomura. I mean, Kawasaki surely doesn't teach you to do this.
17 But beyond that, at page 24, it says "It is still possible to expect an
18 aluminum content cut-down effect of approximately one-tenth with a DC
19 earth area corresponding to 0.1 percent of the whole reaction chamber wall
20 area."

21 And on the other page, it talks about "We think it is considered
22 desirable to provide a conductive material having an area of less than
23 approximately 10 percent to function as the effective earth for high
24 frequency, obtaining advantageous results without fail."

25 Yeah, they did conduct these experiments, but that is described -- I am
26 sure that they did stuff -- although the specification only talks about that

1 range, they have defined upper limits or both upper and lower limits for the
2 range, and I just don't see that in the reference or you can say that it's
3 obvious to do so.

4 The claim also recites the feature that the electrically conductive
5 member forming the DC earth is disposed at a position crossing a magnetic
6 line of force that is closer to the substrate holder than a magnetic line of
7 force that crosses the inner wall of the reaction chamber, having the
8 dielectric thereon.

9 We described that in the specification. I'm not sure that that is a really
10 specific location, but it's a location nevertheless that we defined in terms --
11 and you've got the magnetic field in there. You've got magnetic lines of
12 force. And I'm sure that someone can conduct experiments that say, yes, it's
13 in this position or it's not in this position. The Examiner throws this off as
14 its intended use, "So I don't care about it."

15 JUDGE ROBERTSON: Could I ask you about that as well. The
16 magnetic lines -- I'm looking at figure 2 of your disclosure.

17 MR. KRAUS: Right.

18 JUDGE ROBERTSON: And 50 showed the magnetic lines. And it
19 appears that, you know, as long as the electrically conductive member is
20 structurally positioned in the inner wall closer to where the substrate is that it
21 will cross the magnetic line that is closer to that substrate than the inner wall.
22 And if you look at figure 7, or figure 1, excuse me, of Kawasaki, you know,
23 the position of that electrically conductive member 11 therein appears to be
24 closer to the substrate than the wall. So --

25 MR. KRAUS: Well, I would suggest to you I don't know -- in
26 Kawasaki, I would suggest to you the opposite is the case.

1 JUDGE ROBERTSON: Okay.

2 MR. KRAUS: I mean, it's where -- I have no idea --what is the
3 electrically conductive member considered to be? Is it that little part at the
4 top and this is a wire connection? I don't know. I don't know. There is
5 nothing in Kawasaki that suggests this. You know, this is speculation.

6 And then we get down, as I say, the dependent claims further defined
7 features, dielectric covers 90 percent of the total surface area where these --
8 again, the structure. You've got impedance area per unit. The fact is that --
9 claims recite additional structural features, and the Examiner says, "They're
10 somewhere there." There is nothing in the references to provide these
11 features. And the Examiner just says "Well, it would be obvious to do so."

12 For that reason, I suggest that all claims should be allowable.

13 JUDGE HANLON: No questions? No?

14 JUDGE ROBERTSON: No.

15 JUDGE HANLON: Thank you very much, Mr. Kraus.

16 MR. KRAUS: Thank you.

17 Whereupon, the hearing concluded on May 13, 2009.